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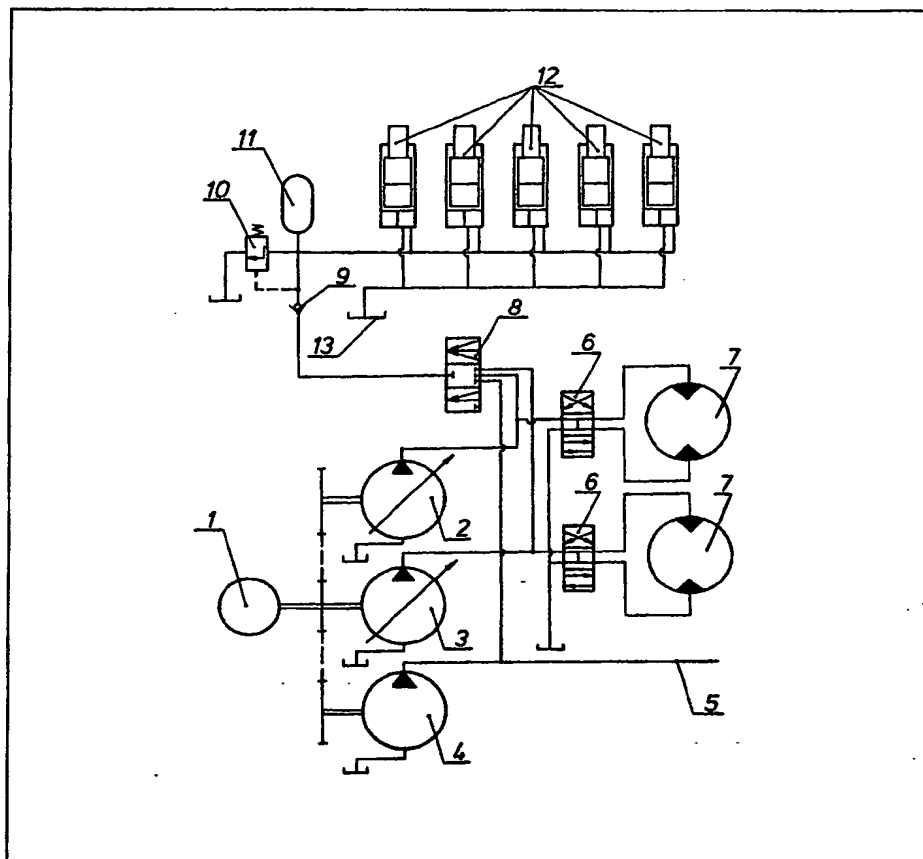
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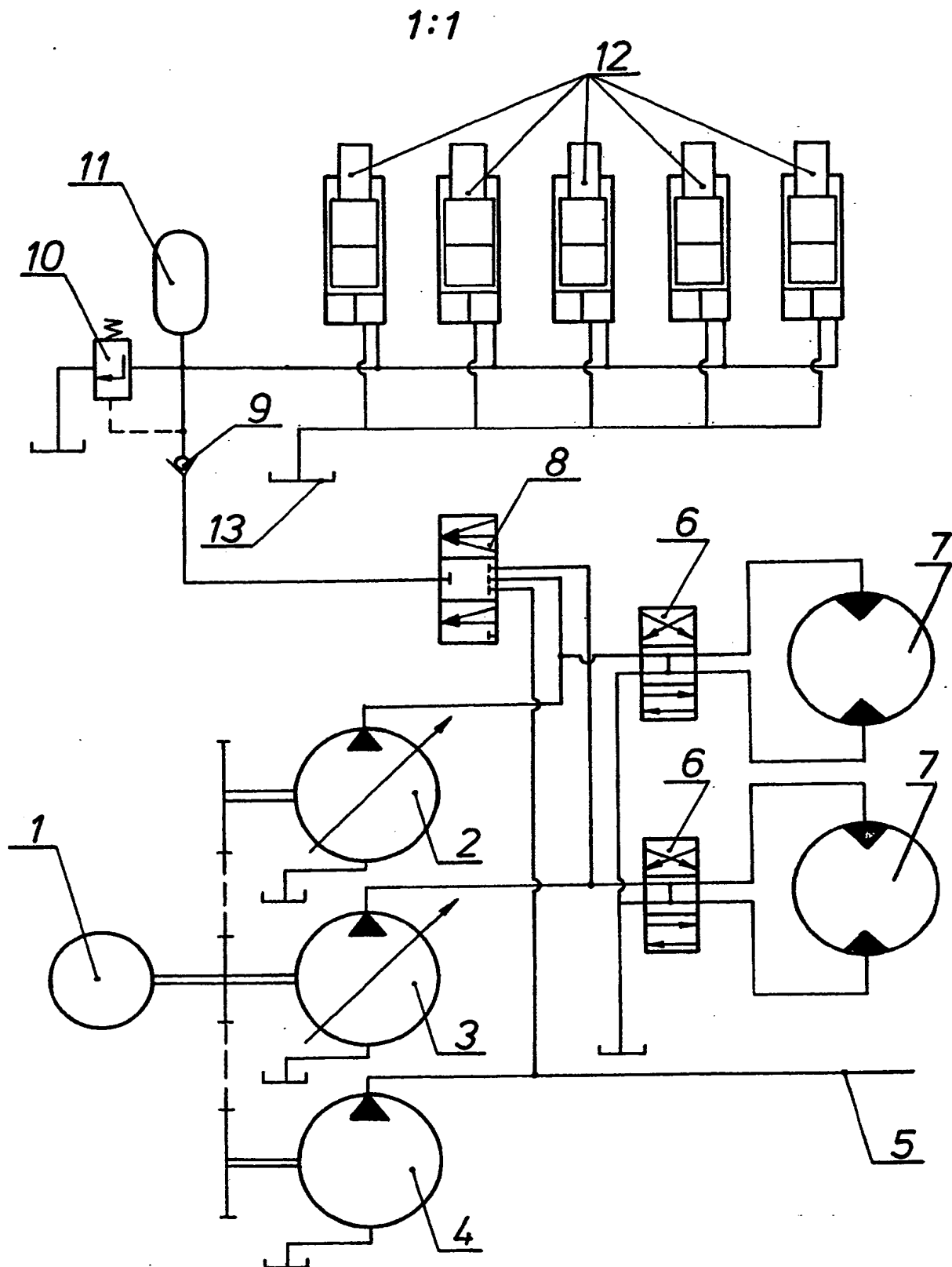
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(54) Hydraulic supply system of a loader

(57) A hydraulic supply system of a loader having a bucket with an active edge, especially for mine headings, or for construction work on the surface, comprises hydraulic pumps 2,3 supplying the motors 7 of tracks of the loader, a pump 4 supplying through conduit 5 the operating hydraulic cylinders of the bucket of the loader, a hydraulic control valve 8 for connecting the pumps 2,3 with the active elements 12, e.g. hammers, of the bucket of the loader, and hydraulic control valves 6 simultaneously connecting pumps 2,3 with the driving motors 7. The control valve 8 can also connect the pump 4 to the active elements 12. The system allows free travel and manoeuvring of the loader, the supply pressure of the active elements being dependent on the resistance to travel of the chassis.





## SPECIFICATION

## Hydraulic supply system of a loader

5 This invention relates to a hydraulic supply system of a loader having a bucket or scoop with an active edge, appropriate especially for dinting in mine headings, or for construction work on the surface.

In loaders with active bucket edges, known from the article "Les rabaissages mécanisés dans l'Unité de production charbon de Lens" published in the journal "Charbonnages De France", note technique 1/75, Juin 1975, and from the article "Rationalisierung der Senkarbeiten im Grubentri b" published in the journal Glückauf, No. 24/1966, p.1263, the active elements, for instance hammers, are actuated pneumatically, whereas the remaining elements of the loader, such as tracks of the chassis and the working organs, are driven hydraulically.

20 There are also known loaders, for instance from the prospectus of the firm Hausherr (W. Germany), issued in 1978, wherein the active elements of the bucket as well as the remaining moving elements of the loader are driven hydraulically, said active elements being supplied from a separate additional source. The active elements work permanently under the maximum pressure in the course of the travel of the loader, regardless of the value of the resistance met by the active edge of the bucket. The system supplying the active elements can be also switched on periodically on meeting the resistance, but only at maximum pressure.

Such a design is disadvantageous since operation of the active elements permanently at maximum pressure causes heating-up of the oil and useless loss of energy.

The invention is aimed at synchronisation of the operation of active elements of the loader with the travel thereof in dependence on the conditions being met by the active edge of the bucket.

In the hydraulic system according to the invention, the hydraulic pump or pumps supplying the hydraulic motors of the tracks of the loader, are simultaneously connected over a manipulator with active elements of the loader bucket. Said manipulator in one of its positions separates the hydraulic circuits of the pump or pumps supplying the tracks, and in another position connects said circuits, directing them to supply the active elements and the tracks simultaneously. Connecting of both chassis supply pumps to operate the active elements does not restrict the manoeuvrability of the loader, and allows free travel at pressures lower than the optimum pressure for supplying the active hydraulic elements of the bucket.

The system according to the invention allows free travel and manoeuvring of the loader, the pressure supplying the active elements being dependent on the travel resistance of the chassis of the loader.

60 The invention will be now described by means of an exemplary embodiment with reference to the accompanying drawing showing the hydraulic supply system of a loader.

An electric motor 1 drives pumps 2 and 3 supplying the motors 7 driving the tracks of the loader,

and the pump 4 supplying through the conduit 5 the operating hydraulic cylinders of the bucket of the loader. The working medium from the pumps 2 and 3 is directed through the control valves 6 to the motors 7 driving the tracks of the loader. Simultaneously, the working medium from the pumps 2 and 3 is directed to a control valve 8 wherefrom on appropriate setting of the valve 8 it flows through a non-return valve 9 to the active elements 12 of the edge of the loader bucket. The system is equipped with a hydraulic accumulator 11 and safety valve 10. The active elements 12 are for example picks or hammers.

To drive the active elements 12 of the loader bucket edge there can be also utilised the pump 4; the pump 4 together with the pumps 2 and 3 is connected through the control valve 8, set in a suitable position, with the active elements 12.

The valve 8 also has a setting in which the active elements 12 are cut off from the pumps 2 to 4; this can be the normal setting.

Such an arrangement enables the pumps 2, 3 that supply the tracks of the loader as a rule separately in order to secure an appropriate manoeuvrability, for simultaneously supplying the active elements 12.

The hydraulic system according to the invention can find employment in mine loaders for dinting, the bucket whereof is provided with hydraulic hammers. Said loader is appropriated for dinting pressed-out floor in dog headings. In the course of operation of the loader in a dog heading it occurs sometimes that the pressed-out floor rocks seize and restrict, or even make impossible the further operation of the loader, that is the travel thereof and dinting of the heading rocks. It is then necessary to remove the obstacle, that is to break it by means of hydraulic hammers. The control valve 8 installed in the system according to the invention enables the automatic adjusting of the value of pressure supplying the hydraulic hammers in dependence on the travel resistance of the chassis. A complete blocking of the motion of the chassis causes an increase of the pressure within the system up to optimum values for supplying the active elements. The operation of the hammers at optimum pressure values is necessary only on occurrence at the bucket of maximum resistance causing the blocking of the tracks. In this case a constant thrust of the tracks occurs with simultaneous operation of the hammers.

115 An advantage of the hydraulic system described above is the restriction of the number of pumps in the system, and securing the minimum heating of the working medium in the course of operation of the loader.

120 It is also possible to employ a third pump for driving the hydraulic hammers, namely that provided for operating the hydraulic manipulating cylinders of the bucket of the loader. Employing the third pump enables the hammers to work at a pressure higher than the rated one, and can be used for mining a very hard floor, or periodically in cases of occurrence of higher resistances of mining.

In operation the control valve 8 is moved manually by the driver and is positioned by operational hydraulic cylinders of the bucket of the loader. Th

control valve 8 enables simultaneous supply of the engines driving the tracks of the loader and the hydraulic hammers. If the speed of the loader is restricted by the resistance at the bucket edge, the working pressure of the hammers is automatically adjusted: when the motion of the loader is stopped consumption of the working medium by the engines driving the tracks of the loader is limited to the amount covering the volume loss of the medium thus full capacity of the driving pumps is directed to the hydraulic hammers, which causes an increase of the supply pressure to the maximum value.

During the manoeuvring motions of the loader and loading of the loose particulate coal, the valve 8 is closed so as to eliminate simultaneous supply to the hydraulic hammers which could cause unnecessary noise and quicker wearing away of the active elements.

## 20 CLAIMS

1. A hydraulic supply system of a loader having a bucket with an active edge, comprising at least one hydraulic pump supplying driving motors of tracks of the loader, and a hydraulic control valve connecting the hydraulic pump or pumps supplying the driving motors to the active elements of the bucket of the loader, said hydraulic pump(s) being also connected by hydraulic control means to the driving motors.

2. A hydraulic supply system of a loader, as claimed in claim 1, having a pump supplying the operating hydraulic cylinders of the bucket of the loader, which pump can be connected to the active elements of the bucket of the loader by way of the hydraulic control valve together with the first-mentioned pump(s).

3. A hydraulic supply system for a loader, substantially as herein described with reference to the accompanying drawing.

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